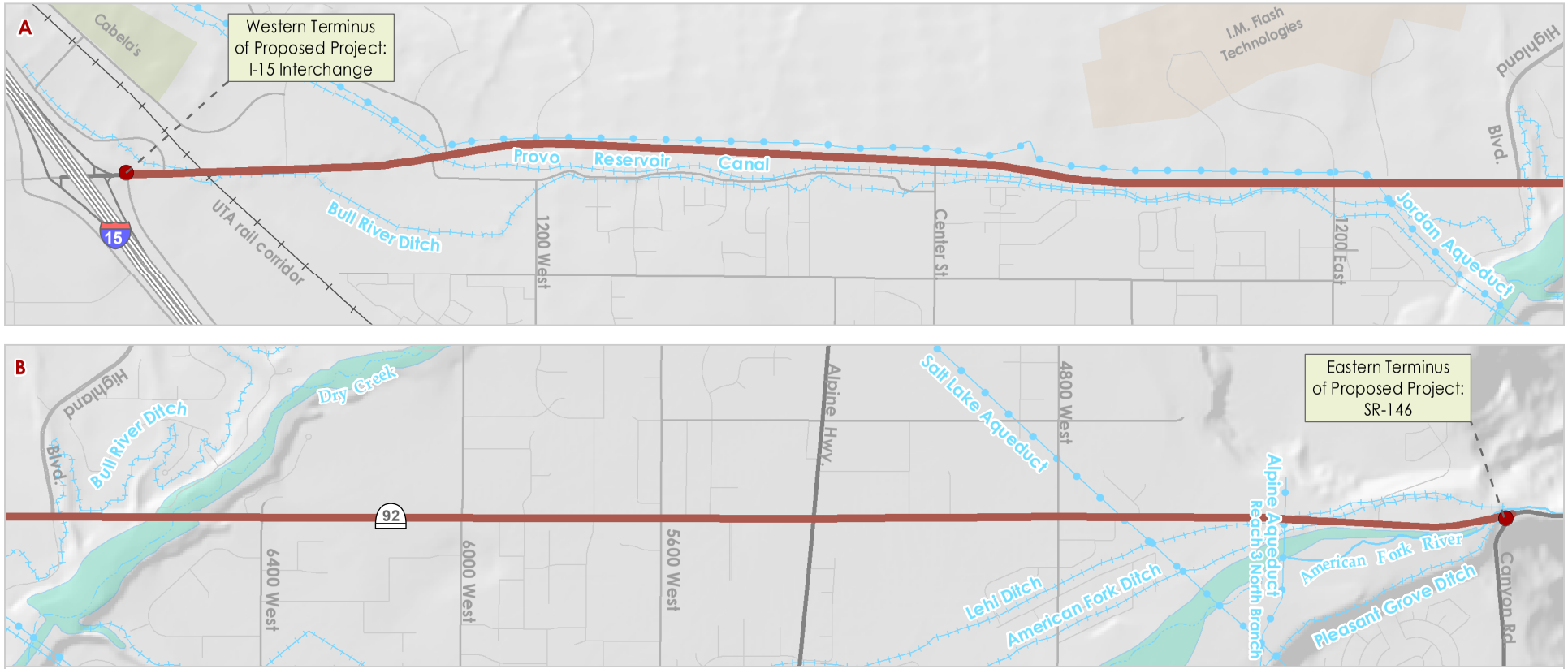
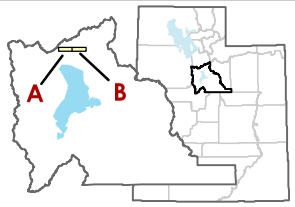


Source: FEMA Flood Insurance Rate Maps (FIRM), distributed by AGRC as "floodplains" dataset.



Project Area Context

SR-92 Project
Freeway
Hwy. Entrance
US Route
State Road
Local Arterial
Residential St.
Railroads

Canal
Tunnel
Aqueduct
Intermittent Stream
Perennial Stream
100 Year Floodplain

Figure 3-17
Water Resources and Floodplains

0 0.25 0.5 Mile

SR-92: Lehi - Highland
Environmental Assessment

Impacts

No-Build Alternative

Other than minor disturbances associated with the on-going maintenance for routine flood control and irrigation management, the No-Build Alternative would not result in any direct or indirect impacts to wetlands, the American Fork River, Dry Creek, or the irrigation ditches. The Provo Reservoir Canal Enclosure project is a separate project proposed by PRWUA and would involve the placement of the canal into a pipe or box culvert. A separate environmental assessment for the canal enclosure project has been completed by Reclamation.

Under the No-Build Alternative, UDOT would still have to address the roadway embankment's erosion, which is caused by the American Fork River. The Jersey barriers in the channel are not a viable long-term solution. If channel stabilization is not done in conjunction with roadway improvements, a separate stabilization project would be required.

Preferred Alternative

Direct Impacts

The Preferred Alternative would not result in any direct impacts to wetlands because there are no wetlands within the study area. Roadway widening would require the extension or replacement of existing culverts and the piping or relocation of certain ditch segments; see Table 3-26 for more detail. In addition, a new multi-use trail bridge would span the American Fork River. Channel impacts reported for the Preferred Alternative are the maximum length that could potentially be impacted (i.e., the entire length of the channel within the right-of-way and easements). It is likely that actual impacts would be less than reported here. Figure 3-18a through Figure 3-18c depict the water resource impacts.

Dry Creek

Approximately 83 linear feet of Dry Creek exist within the study area and could potentially be impacted. This length does not include the section that is in an existing box culvert under SR-92. It is anticipated that actual impacts after final design would be negligible. The existing 171-foot long culvert at the Dry Creek road crossing would remain in place and a new, parallel box culvert would be constructed adjacent to it. The new box culvert would provide additional hydraulic capacity.

American Fork River

Approximately 1,497 linear feet of the American Fork River occurs within the study area and could potentially be impacted. It is anticipated that actual impacts after final design would be roughly 65 percent of this length. Impacts would result from replacement of the existing box culvert at the SR-92 crossing, construction of a new multi-use trail bridge, and construction of a wall parallel to the channel. Under the Preferred Alternative, SR-92 would be shifted to the south at the American Fork River crossing. A new box culvert roughly 175-feet long would be constructed at this location and most of the existing 141-foot long box culvert would become an open channel. A new bridge would be constructed to carry the Highland Canyon Trail and Cedar Hills golf cart path across the river. This bridge, including abutments, would span the OHWM and would be roughly 30 feet wide.

Retaining walls would be placed between the multi-use trail south of SR-92 and the American Fork River. The retaining walls would be constructed outside the OHWM for most of their length.

At one location, the walls would be constructed at the OHWM. At this location, the retaining walls would replace existing concrete Jersey barriers along an unstable portion of the north river bank. These barriers were placed by UDOT to prevent the roadway embankment from washing away. DWRi issued a stream alteration permit in July 2005—Permit Number 05-55-09SA—approving the installation of the Jersey barriers as a temporary bank stabilization measure. This approval was accompanied by the provision that a long-term plan to stabilize the river bank at this location would be developed. UDOT is going coordinate DWRi's approval of the retaining walls as the long-term stabilization plan in accordance with the conditions specified in the existing stream alteration permit. It is estimated that roughly 800 linear feet of walls would be constructed within the jurisdictional limits of DWRi.

Provo Reservoir Canal

Approximately 1,814 linear feet of the Provo Reservoir Canal occurs within the study area and could potentially be impacted. It is anticipated that actual impacts after final design would be roughly 25 percent of this length. At the SR-92 crossing, the existing 179-foot long box culvert would be replaced with a new culvert roughly 600 feet long. A siphon may be required at this crossing to get the canal under the express lanes. At the Center Street crossing, the existing 60-foot long box culvert would be extended or replaced with a new box culvert roughly 95 feet long. Road improvements would be designed to avoid or minimize direct impacts to segments of the canal that parallel the SR-92 road alignment; walls would be constructed at multiple locations.

Bull River Ditch

Approximately 2,867 linear feet of the Bull River Ditch is situated within the study area and could potentially be impacted. It is anticipated that actual impacts after final design would be roughly 90 percent of this length. East of the I-15 frontage road, roughly 1900 linear feet of open ditch running parallel to SR-92 would be placed in a pipe. At the 1200 West crossing, the existing 65-foot long culvert would be extended or replaced with a new culvert roughly 85 feet long. West of 1200 East, roughly 180 linear feet of open channel would be placed in a pipe. At the SR-92 crossing east of Highland Boulevard, the existing 107-foot long culvert would be replaced with a new culvert that is roughly 300 feet long. At this crossing, a siphon would be constructed or the culvert would be suspended from the express lane bridge. West of this crossing, roughly 430 linear feet of open channel would either be relocated or piped.

Lehi Ditch

Approximately 702 linear feet of the Lehi Ditch and the Lehi Upper South Club lateral are situated within the SR-92 study area. It is anticipated that nearly all of this would be impacted. Approximately 400 linear feet of the Lehi Ditch would be impacted at the SR-92 road crossing. The existing culvert would be replaced and sections running parallel to the road would be placed in pipes to accommodate the placement of fill material for road widening. The existing 101-foot and 60-foot culverts crossing SR-92 and the access road on the north side of SR-92 would be replaced with a new pipe roughly 450 feet long. There may also be a need to relocate or pipe up to 800 linear feet of the unnamed lateral ditch on the south side of SR-92, depending on the fill limits for the final road design.

American Fork Ditch

Approximately 1,447 linear feet of the American Fork Ditch is situated within the study area and could be potentially impacted. It is anticipated that actual impacts after final design would be roughly 85 percent of this length. At the SR-92 crossing, the existing 199-foot long culvert would

be replaced with a new culvert that is roughly 450 feet long. In addition, approximately 970 linear feet of ditch paralleling the north side of SR-92 would be piped to accommodate the placement of fill material for road widening.

Wynn Ditch, Mitchell Ditch, and Pleasant Grove Ditch

Approximately 125 linear feet of the Wynn Ditch are situated within the SR-92 study area. It is anticipated that this entire length would be impacted by replacing the existing culvert at the SR-92 crossing. There would be no impacts to the Mitchell Ditch because it diverts from the American Fork Ditch outside the study area. Approximately 254 linear feet of the Pleasant Grove Ditch are situated within the SR-92 study area and could potentially be impacted. It is anticipated that actual impacts after final design would be roughly 75 percent of this length. The existing 191-foot culvert at the SR-92 crossing would be replaced with a new culvert approximately 380 feet long.

Table 3-26: Potential Water Body Impacts Under the Preferred Alternative

Water Bodies	Maximum Possible Impact Length (Linear Feet)
Perennial Streams	
American Fork River	1,497
Intermittent Streams	
Dry Creek	83
Canals and Ditches	
Lehi Ditch/Lehi Upper South Club	702
American Fork Ditch	1,447
Wynn Ditch	125
Pleasant Grove Ditch	254
Bull River Ditch	2,867
Provo Reservoir Canal	1,814

As discussed in Section 3.12, stormwater runoff from paved roadway surfaces would not discharge to the American Fork River or any of the canals and ditches listed in Table 3-26. Discharges to Dry Creek would not increase from the existing rate.

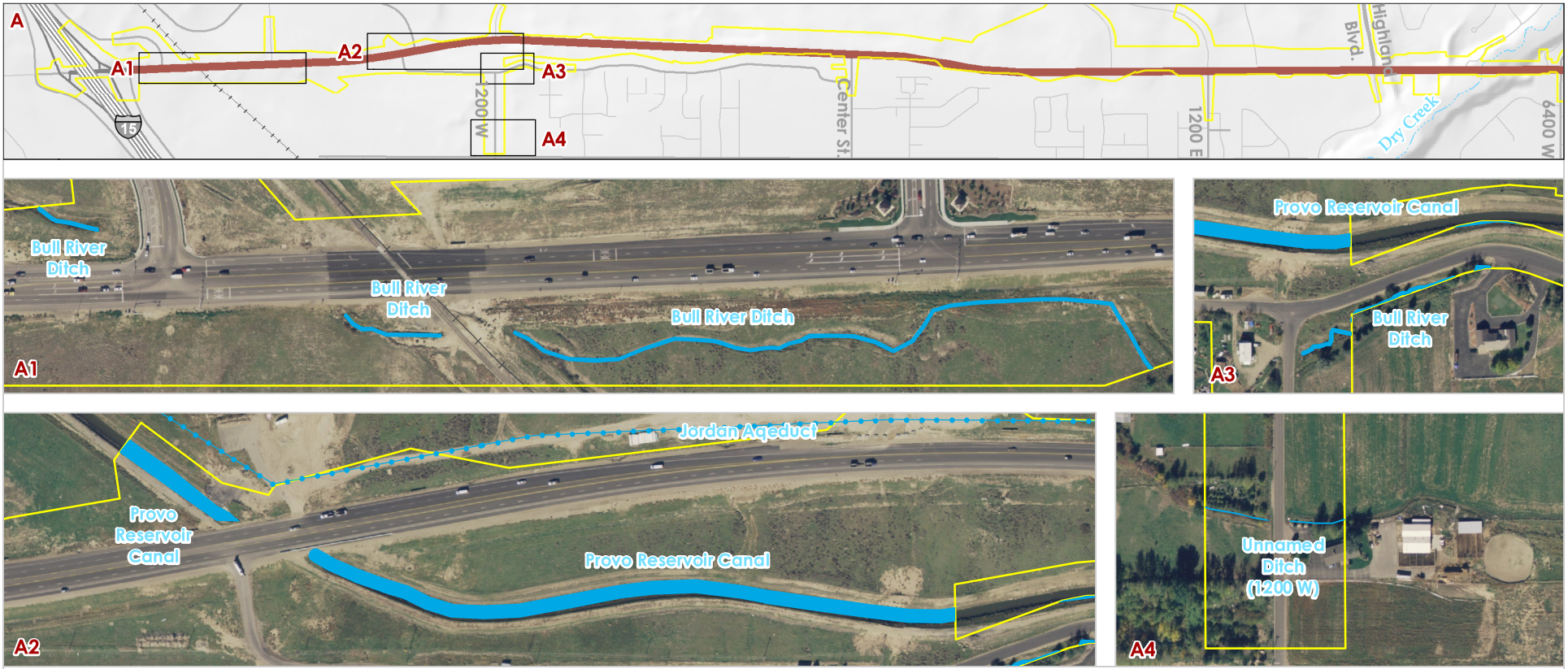
Aqueducts

Approximately 12,400 linear feet of the Jordan Aqueduct is situated within the study area where it parallels SR-92. Additionally, the Alpine Aqueduct Reach 3 parallels and shares the right-of-way with the Jordan Aqueduct where it crosses under SR-92. Roadway widening for the Preferred Alternative could result in the construction of walls adjacent to the aqueduct easement; it could also result in the placement of roadway improvements, such as embankment, within the easement. An additional 220 linear feet of the Jordan Aqueduct is situated within the study area where it crosses SR-92. Under the Preferred Alternative, SR-92 could be realigned or widened at this crossing. Coordination with JVWCD, MWDSLS, and CUWCD would take place during design to ensure the structural integrity of both aqueducts is not compromised by roadway improvements.

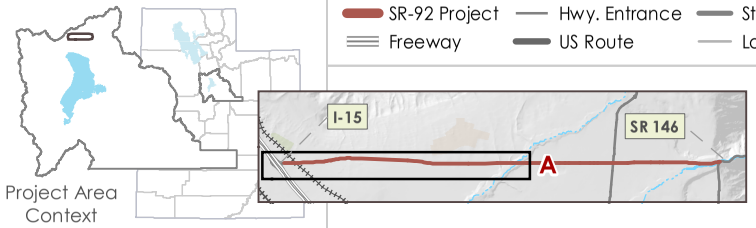
Approximately 175 linear feet of the Salt Lake Aqueduct and 195 linear feet of the Alpine Aqueduct Reach 3 North Branch Pipeline are situated within the study area where they cross under SR-92. Under the Preferred Alternative, SR-92 would be widened at these crossing locations. Coordination with MWDSLS and CUWCD would take place during design to ensure the structural integrity of the aqueducts is not compromised by roadway improvements.

Temporary Construction Impacts

Temporary erosion and sediment loading is discussed in Section 3.12.



Source: Frontier Corp.



SR-92 Project
Freeway
Hwy. Entrance
US Route
State Road
Local Arterial
Residential St.
Railroads
Canal
Tunnel
Intermt. Stream
Perenn. Stream
Aqueduct

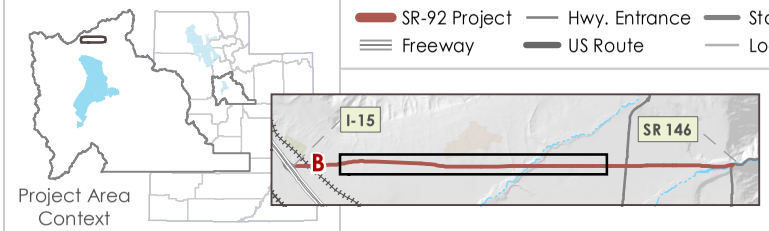
Potentially Impacted Water Resources
Potentially Impacted Aqueducts
Project Footprint

0 270 540 Feet

Figure 3-18a
Water Resources Impacts (West)

SR-92: Lehi - Highland
Environmental Assessment

Source: Frontier Corp.



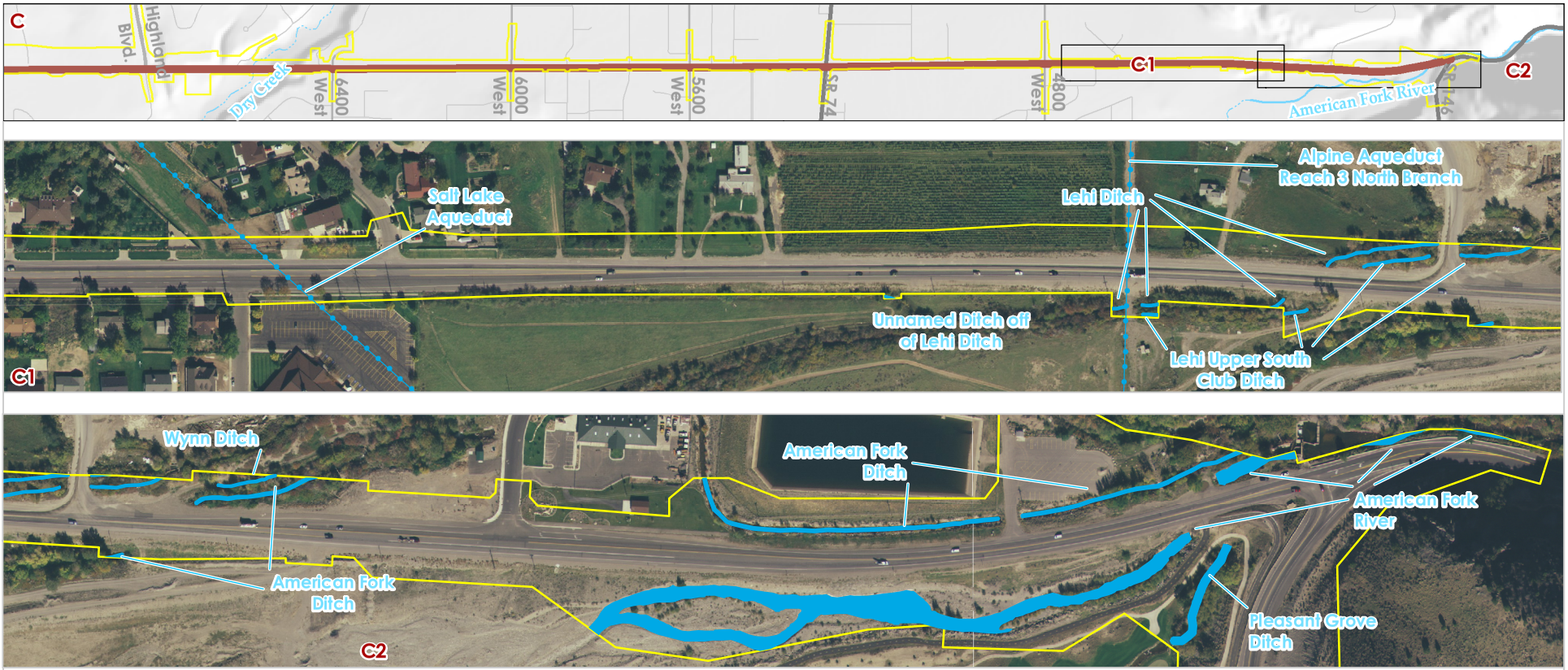
SR-92 Project
Freeway
Hwy. Entrance
US Route
State Road
Local Arterial
Residential St.
Railroads
Canal
Tunnel
Intermt. Stream
Perenn. Stream
Aqueduct

Potentially Impacted Water Resources
Potentially Impacted Aqueducts
Project Footprint

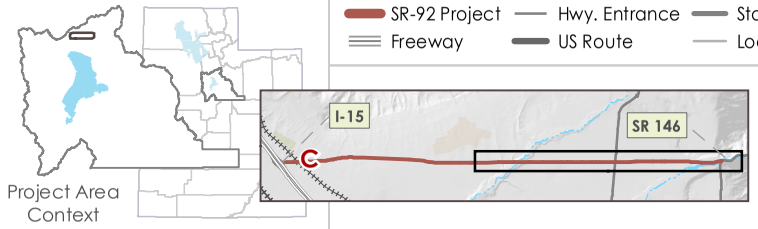
0 260 520 Feet

Figure 3-18b
Water Resources Impacts (Central)

SR-92: Lehi - Highland
Environmental Assessment



Source: Frontier Corp.



SR-92 Project | Hwy. Entrance | State Road | Residential St. | Canal | Intermt. Stream | Aqueduct
Freeway | US Route | Local Arterial | Railroads | Tunnel | Perenn. Stream

Potentially Impacted Water Resources
Potentially Impacted Aqueducts
Project Footprint

0 250 500 Feet

Figure 3-18c
Water Resources Impacts (East)

SR-92: Lehi - Highland
Environmental Assessment

Mitigation

No-Build Alternative
No mitigation would be required under the No-Build Alternative.

Preferred Alternative
The following mitigation measures will be implemented for water resources:

- For impacts to the American Fork River, UDOT will obtain a CWA Section 404 permit from USACE and a state stream alteration permit from DWRi.
- The multi-use trail across the American Fork River will span the OHWM.
- For impacts to Dry Creek UDOT will obtain a state stream alteration permit from DWRi.
- A CWA Section 404 permit will also be obtained for impacts to man-made canals and ditches if USACE determines that they are jurisdictional and that a permit is required.
- Water bodies temporarily impacted by construction-related activities will be restored to their pre-disturbance condition.
- Permanent impacts to water bodies will be mitigated in accordance with CWA Section 404 and state stream alteration rules. Mitigation for temporary erosion during construction is discussed in Section 3.12.

Measures to avoid and minimize impacts to the Provo Reservoir Canal, the Jordan Aqueduct, the Salt Lake Aqueduct, the Alpine Aqueduct Reach 3, and the Alpine Aqueduct Reach 3 North Branch have been included in the design. Any impacts to the Provo Reservoir Canal must be approved by Reclamation and PRWUA. Reclamation and PRWUA have indicated that no retaining walls can be located within the Provo Reservoir Canal easement. Impacts to the aqueducts will also require approvals, as shown on Table 5-2. Table 5-2 also shows a summary of required permits and approvals required for construction.

3.10 FLOODPLAINS

Regulatory Setting

Floodplains have been assessed for the project in accordance with 23 CFR 650, FHWA requirements, and EO 11988 Floodplain Management (42 CFR 26951), which requires agencies to reduce the risk of flood loss, to minimize the impact of floods on humans, and to restore and preserve the natural and beneficial values served by floodplains.

Affected Environment

The flood insurance studies (FISs) and flood insurance rate maps (FIRMs), which are prepared by FEMA for local governments, were reviewed to determine flood hazard areas, including 100-year floodplains. The floodplains identified within the study area include portions of Dry Creek and the American Fork River and are depicted in Section 3.9 and Figure 3-17.

Dry Creek
Dry Creek is an intermittent stream channel that crosses the SR-92 study area between MP 4.1 and MP 4.2. Federal Emergency Management Agency (FEMA) characterized this stream as having a history of destructive flooding and debris transport. Following a major flood event in 1951, the Dry Creek Dam was constructed downstream from the SR-92 crossing. The segment of Dry Creek crossed by SR-92 is designated as a 100-year floodplain with determined base-flood elevations. Deposition behind this dam appears to have reduced the storage volume of this reservoir and the

average slope of the channel downstream from the SR-92 road crossing. Consequently, alluvium has been deposited above, within, and downstream from the SR-92 culvert.

American Fork River

The American Fork River enters the east end of the SR-92 study area at approximately MP 7.5. The river has a 100-year floodplain with determined base-flood elevations and is located on the south side of SR-92, beginning at the culvert outlet that crosses under SR-92. The maximum-recorded flood for this section of the American Fork River resulted from a thunderstorm in August 1951. Consequently, a flood control and debris basin was built downstream from the SR-92 crossing to protect downstream properties from flood hazards.

Within the SR-92 study area, the American Fork River has been straightened and entrenched. This entrenchment begins at the culvert outlet that crosses under SR-92. The remaining floodplain is confined within the banks of this entrenched reach. The base of the existing SR-92 road embankment impinges on the American Fork River's active floodplain. The installation of Jersey barriers is currently used as a temporary measure to reduce the erosion of the road embankment.

Impacts

No-Build Alternative

Direct Impacts

No direct impacts to either Dry Creek or the American Fork River floodplains would be expected under this alternative.

Indirect Impacts

The existing floodplain and hazards to downstream properties at the Dry Creek crossing would likely remain unchanged because of the overriding control of the Dry Creek Dam. The American Fork River's active floodplain would continue to exert erosive pressure on the base of the SR-92 roadway embankment.

Preferred Alternative

Direct Impacts

The Preferred Alternative would construct a new box culvert adjacent to the exiting box culvert in order to provide additional hydraulic capacity. The new crossing would result in an improved and slightly expanded floodplain condition because it would allow flood flows to pass more freely through the road crossing. Subsequently, there would be no net loss of floodplain function at Dry Creek's reconstructed road crossing; see Figure 3-17 for more detail.

The existing culvert at the American Fork River crossing would be extended or replaced downstream from the base of the widened roadway embankment. The culvert would be sized to accommodate flood flows, but the installation of the culvert would result in the filling of the 100-year floodplain. Where the road is in close proximity to the American Fork River, retaining walls would be used, as practicable, to minimize the encroachment of additional roadway embankment into the 100-year floodplain. It is not anticipated that encroachment to floodplains would result in an increase of floodwater elevation.

A multi-use bridge would be constructed across the American Fork River floodplain to link existing trail systems. Bridge abutments would be placed outside of the OHWM and would not encroach below this OHWM. However, the abutments would encroach on the 100-year floodplain.

Indirect Impacts

Flood hazards to upstream properties at the Dry Creek and American Fork River road crossings would not be affected because the crossings would be properly sized to pass 100-year flood flows. Flood hazards to downstream properties at the Dry Creek and American Fork River road crossings would not be affected because of a mitigating factor—existing flood control basins—located immediately downstream of these crossings.

Mitigation

A floodplain encroachment permit will be obtained from Utah County for the following improvements:

- Construction of a new box culvert at Dry Creek
- Replacement of the existing culvert for the American Fork River road crossing
- Placement of bridge abutments for the new multi-use trail bridge crossing of the American Fork River
- Any other incidental floodplain encroachments that may result from road widening

Also, a state stream alteration permit will be obtained from DWRi for impacts to the American Fork River and Dry Creek, as discussed in Section 3.9.

3.11 WILD AND SCENIC RIVERS

Regulatory Setting

In accordance with the Wild and Scenic Rivers Act (Public Law 90 to 542, as amended, and 16 USC 1271 to 1287), wild and scenic rivers have been assessed within the study area.

Affected Environment

Between I-15 and the mouth of American Fork Canyon, wild and scenic rivers were assessed within a one-mile buffer, which was measured from the centerline of the existing SR-92 corridor. There are no wild and scenic rivers within the study area.

The closest river identified as potentially suitable for the National Wild and Scenic Rivers System is a portion of the south fork of the American Fork River. This reach of river is approximately eight miles from the study area and therefore would not be impacted by the project.

Impacts

There are no direct or indirect impacts to designated areas of wild and scenic rivers or to potentially suitable areas of wild and scenic rivers as a result of either the No-Build or Preferred Alternative.

Mitigation

Because there are no negative impacts to wild and scenic rivers under the Preferred Alternative, mitigation is not necessary.

3.12 WATER QUALITY

Regulatory Setting

Clean Water Act

Water quality is regulated under the CWA. Section 401 of the CWA requires a water quality certification for any project that discharges into waters of the United States or that involves a federal license or permit. In Utah, the 401 certification is incorporated in the 404 permitting process. Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States. This program is jointly administered by USACE and EPA. See Section 3.9 for a detailed discussion of Section 404 and waters of the United States.

EPA has regulatory authority of the CWA and delegates portions to the Utah Department of Environmental Quality's (DEQ's) Division of Water Quality (DWQ). Under the CWA, each state must establish water quality standards that include a narrative description of the designated uses (i.e., beneficial use classification) and the specific chemical and biological criteria necessary to protect the designated uses.

Beneficial Use Classifications

Beneficial use classifications are based on the way in which the water is used:

- For use as domestic water source (e.g., drinking water)
- For recreational use and aesthetics
- For use by aquatic wildlife
- For agricultural use

All major water bodies in the state are assigned one or more beneficial use classifications by DWQ.

TMDLs

Section 303(d) of the CWA requires that each state compile a list of impaired waters that do not meet the water quality standards for their designated beneficial use; this list is referred to as the 303(d) list. Once listed, DWQ must prepare a plan that outlines how the water's quality will be restored to its beneficial use standards. The plan must include a total maximum daily load (TMDL) analysis, which determines the amount of a specific pollutant a water body can receive without exceeding water quality standards.

UPDES

Section 402 of the CWA includes the regulations that pertain to the National Pollutant Discharge Elimination System (NPDES). The DWQ administers Section 402 by requiring a Utah Pollutant Discharge Elimination System (UPDES) Storm Water General Permit for Construction Activities for any project disturbing more than one acre. This permit requires that a stormwater pollution prevention plan (SWPPP) be developed and implemented prior to construction. Dewatering activities, if necessary during construction, may require a UPDES General Permit for Construction Dewatering.

Groundwater

Groundwater quality protection is regulated under Utah Administrative Code (UAC) R317-6. DWQ regulates groundwater injection facilities through the Underground Injection Control (UIC) program (R317-7). Dry wells are underground structures that are designed to collect

stormwater runoff and allow this runoff to infiltrate into the ground. Dry wells are considered Class V injection wells and are inventoried under the UIC program.

Drinking Water

The quality of drinking water is regulated under the Federal Safe Drinking Water Act. The act was amended in 1996 and now requires all states to develop assessment programs; these programs evaluate the risk of accidental contamination. In Utah, the Division of Drinking Water (DDW) administers the Drinking Water Source Protection (DWSP) program. Each public drinking water supplier must have a DWSP plan approved by DDW. Delineated for management purposes, this plan includes source protection zones for groundwater sources:

- Zone 1: Area within a 100-foot radius from the wellhead.
- Zone 2: Area within a 250-day groundwater capture zone of the wellhead.
- Zone 3: Area within a 3-year groundwater capture zone of the wellhead.
- Zone 4: Area within a 15-year groundwater capture zone of the wellhead.

This plan also includes source protection zones for surface water sources:

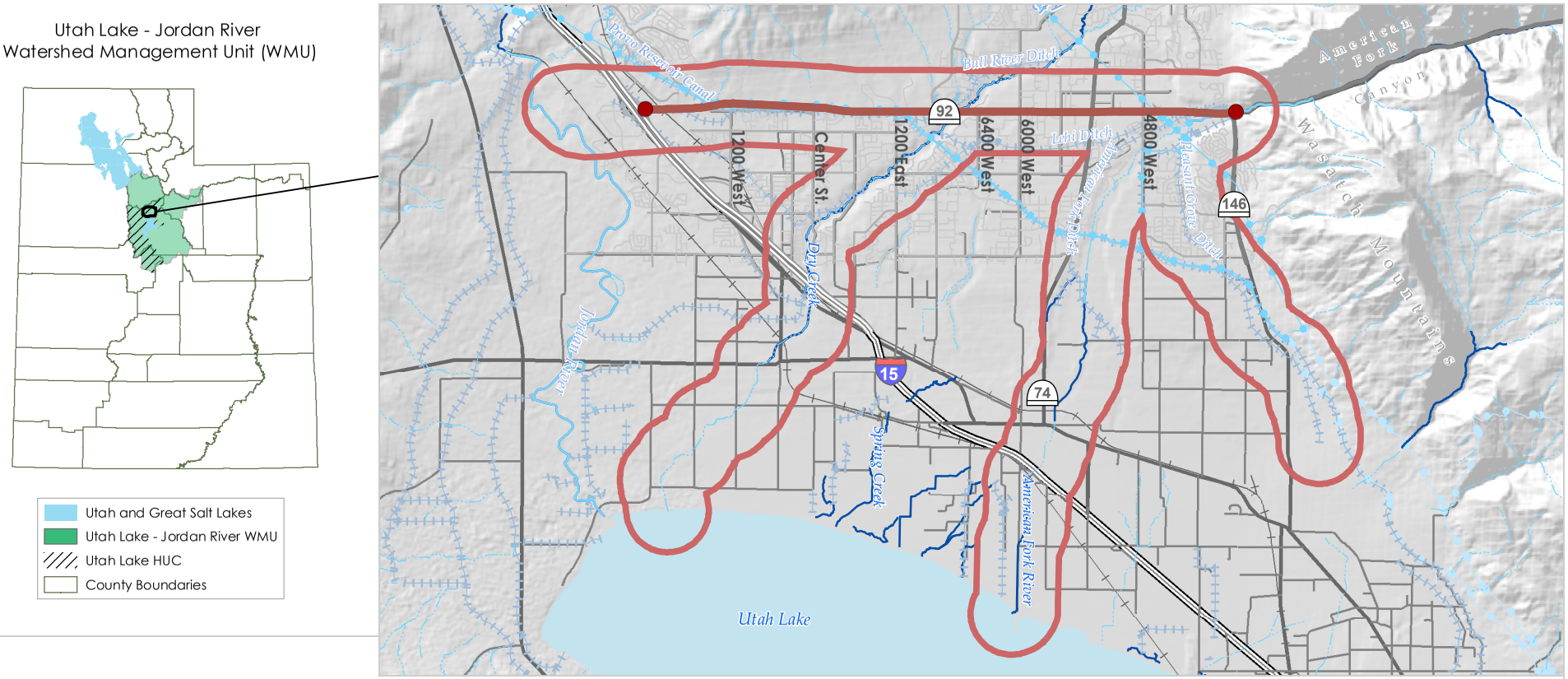
- Zone 1: Area within a half mile from the surface water. It must also be 100 feet downstream to 15 miles upstream from the point of diversion.
- Zone 2: Area from the end of Zone 1 and an additional 50 miles upstream. It must also be 1000 feet on each side.
- Zone 3: Area from the end of Zone 2 to the limits of the watershed or state line. It must also be 500 feet on each side.
- Zone 4: Remainder of the area of the watershed contributing to the source that does not fall within the boundaries of Zones 1 through 3.

Potential contamination sources (PCS) are identified within each zone. A PCS is defined as "any facility or site that employs an activity or procedure [that] may potentially contaminate groundwater." The DWSP plan must also contain a management program to control each PCS and to control or prohibit future PCSs. Various activities could be restricted if they jeopardize the source's water quality.

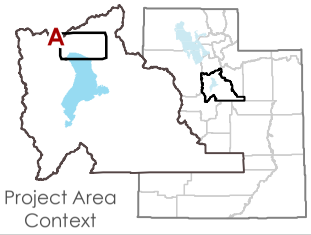
Affected Environment

Surface Water

Major water resources along the corridor are discussed in detail in Section 3.9 and include American Fork River, Dry Creek, and numerous canals and ditches. The project is located within the Utah Lake Watershed (HUC 16020201), which is part of the Jordan River and Utah Lake Watershed Management Unit. Watershed boundaries and surface waters are shown on Figure 3-19.



Sources: Utah AGRC and Utah County. No changes were made to the data displayed.



SR-92 Project | Hwy. Entrance | State Road | Residential St. | Canal | Intermt. Stearm | Aqueduct
Freeway | US Route | Local Arterial | Railroads | Tunnel | Perenn. Stream

Surface Water Study Area

0 1 2 Mile

Figure 3-19

Watershed Boundaries and Surface Waters

SR-92: Lehi - Highland
Environmental Assessment

American Fork and Associated Irrigation Ditches

The American Fork River flows from headwaters on Mount Timpanogos down through American Fork Canyon. At the canyon mouth, it is diverted into multiple irrigation ditches: Pleasant Grove, American Fork, Mitchell, Wynn, and Lehi ditches. At the east end of the project, the river and ditches cross under SR-92 in separate culverts. Irrigation tailwater from these ditches returns to the American Fork River, Dry Creek, or into storm drain systems. The natural stream channel of the American Fork River eventually reaches the north shore of Utah Lake but is frequently dewatered. Stormwater runoff from SR-92 currently sheet flows into the American Fork River as well as the Pleasant Grove, American Fork, and Lehi ditches between 4800 West and SR-146; a curb and gutter does not exist at this location. Sheet flow is a very shallow, slow-velocity overland flow and is not channelized.

Dry Creek

Dry Creek is an intermittent stream that eventually flows into Utah Lake and also crosses under SR-92. SR-92 currently does not have a curb and gutter system where it crosses Dry Creek; stormwater sheet flows off the road at this location.

Provo Reservoir Canal

The Provo Reservoir Canal diverts water from the Provo River seven miles downstream from Deer Creek Dam and runs northwest 23 miles to the point-of-the-mountain facility. It flows parallel to SR-92 on the west end of the project and is siphoned under Dry Creek. The canal delivers irrigation, municipal, and industrial water throughout its entire length. As discussed in Section 3.9, it also supplies drinking water to the Salt Lake Valley. The area within a half mile of the Provo Reservoir Canal is designated as DWSP Zone 1. SR-92 falls within Zone 1 for roughly four miles between I-15 and Dry Creek. Unauthorized storm water inflows, irrigation return flows, and animals entering the canal are potential threats to water quality (Reclamation 2003). SR-92 currently does not have a curb and gutter system where the canal runs parallel to the road. Stormwater runoff from SR-92 currently sheet flows off the roadway and some may discharge into the canal. Stormwater discharges are not allowed into the canal, and a plan to enclose it has recently been approved.

Bull River Ditch

The Bull River Ditch diverts irrigation water from Dry Creek and flows west to a large pond at Pilgrim's Landing north of Thanksgiving Point. Because most of the ditch's water is used for irrigation, the pond infrequently overflows into the Jordan River. There are currently some stormwater discharges to the Bull River Ditch; this is consistent with the *Lehi City Master Plan*, which allows 0.05 cfs per acre. SR-92 does not have a curb and gutter system where the canal runs parallel to the road. Stormwater runoff from SR-92 currently sheet flows off the roadway and discharges into Bull River Ditch.

Utah Lake and Jordan River

Utah Lake is approximately five miles south of the corridor. It outflows to the Jordan River, which eventually flows to the Great Salt Lake.

Surface Water Quality

The beneficial uses of the surface waters are shown on Table 3-27.

Table 3-27: Beneficial Use Assessment

Water Body	Beneficial Use Class	Assessment	Pollutant	Comment
American Fork River, Downstream from Diversion at Mouth of American Fork Canyon	2B, 3D	Not Assessed	N/A	N/A
Pleasant Grove Ditch	2B, 3E, 4	Not Assessed	N/A	N/A
American Fork Ditch	2B, 3E, 4	Not Assessed	N/A	N/A
Lehi Ditch	2B, 3E, 4	Not Assessed	N/A	N/A
Dry Creek	2B, 3A, 4	Not Assessed	N/A	N/A
Provo Reservoir Canal	2B, 3E, 4	Not Assessed	N/A	N/A
Bull River Ditch	2B, 3E, 4	Not Assessed	N/A	N/A
Utah Lake	2B, 3B, 3D, 4	Partially Supporting for Class 3B	Total Phosphorus (TP); Total Dissolved Solids (TDS)	TMDL in Progress, Target Date is April 1, 2010
Jordan River, from Narrows to Utah Lake	1C, 2B, 3B, 4	Not Supporting for Class 4	TDS	TMDL in Progress

1C: Protected for domestic purposes with prior treatment as required by DDW.
2B: Protected for secondary contact recreation such as boating, wading, or similar uses.
3A: Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
3B: Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
3D: Protected for waterfowl, shore birds, and other water-oriented wildlife not included in Classes 3A, 3B, or 3C; this beneficial use classification also includes the necessary aquatic organisms in these animals' food chain.
3E: Severely habitat-limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.
4: Protected for agricultural uses, including irrigation of crops and stock watering.

Source: UAC R317-2-13, DWQ 2006 Integrated Report Volume II, 303 (d) list of impaired waters

DWQ has completed a water quality assessment for Utah Lake and the American Fork River upstream from the diversion at the canyon mouth; the other surface waters in the study area have not been assessed. Utah Lake is listed on the 2006 303(d) list for only partially supporting its beneficial use classification. The pollutants exceeding standards in Utah Lake are total dissolved solids (TDS) and total phosphorus (TP) amounts. TDS measures the concentration of mineral salts in water. TDS violations in Utah Lake are largely due to natural conditions and nonpoint source return flow and seepage from irrigated lands (DWQ). It is estimated that 75 percent of the phosphorous load to Utah Lake is from wastewater treatment plants (Horns). A TMDL for Utah Lake is expected in the spring of 2010.

The American Fork River upstream from the mouth of American Fork Canyon was listed on the 2004 303(d) list for only partially supporting its beneficial use classifications. The pollutant exceeding standards is pH. DWQ is currently requesting that the American Fork River be removed from the 303(d) list; an intensive survey that took place from 2004 to 2005 indicated that pH levels met or exceeded standards.

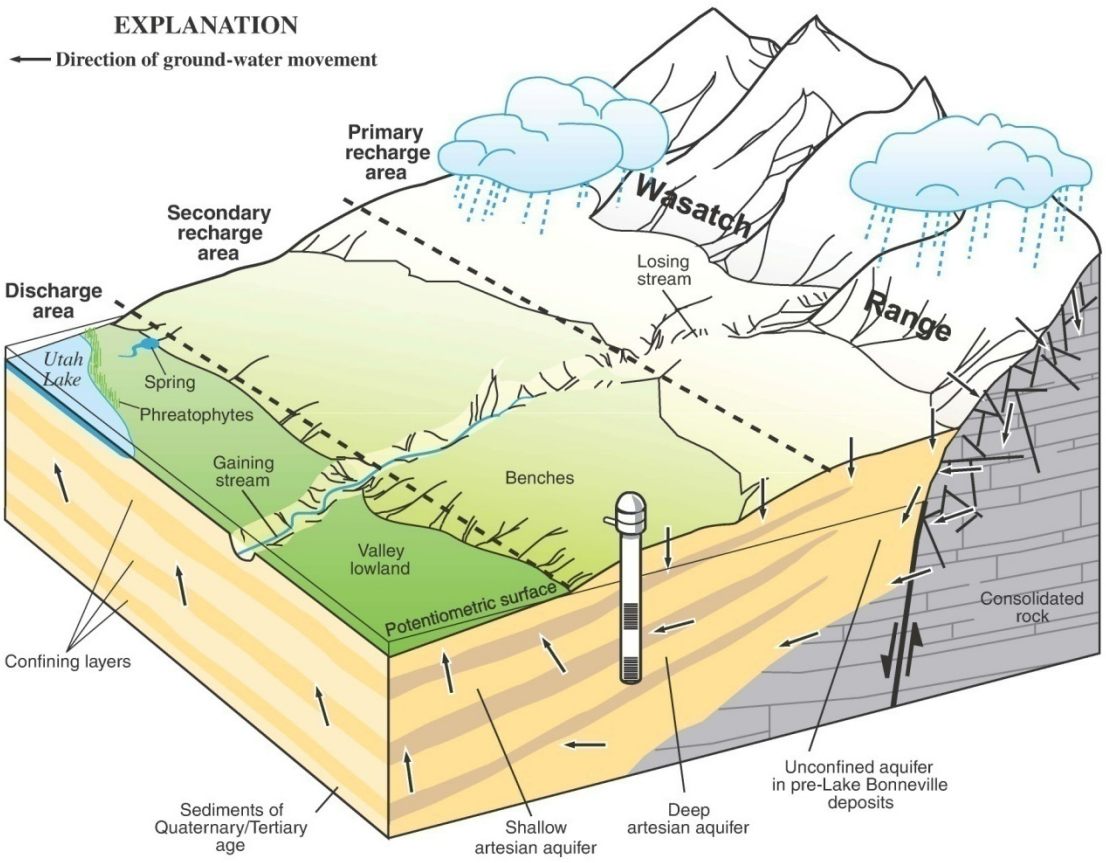
Due to resource limitations, DWQ must prioritize which waters are assessed. The American Fork River downstream from the diversion at the canyon mouth is frequently dewatered and has not been assessed. Dry Creek is intermittent and also has not been assessed. In general, irrigation ditches and canals are not assessed.

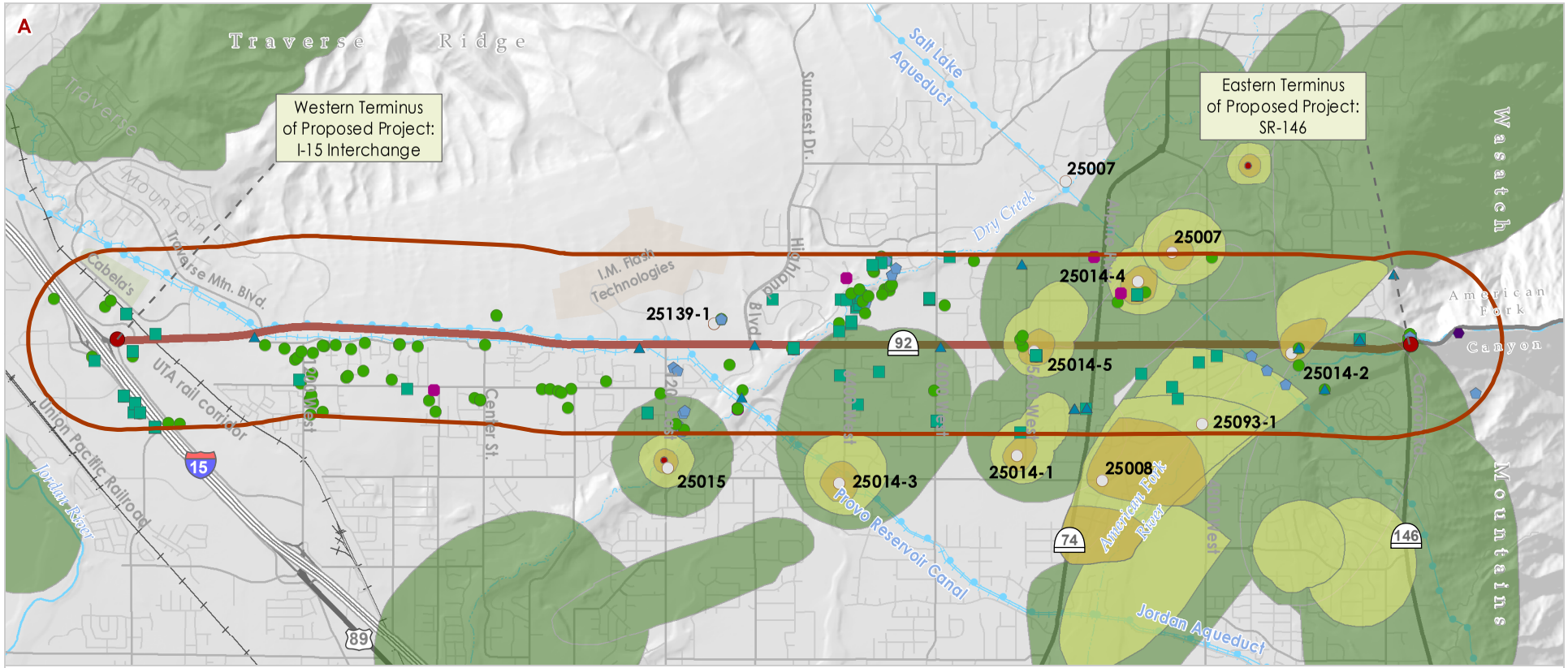
Groundwater Resources

Aquifers

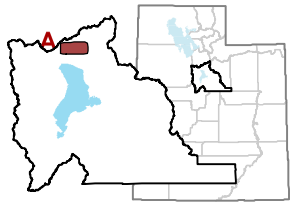
There are four distinct aquifers in northern Utah Valley: a shallow unconfined aquifer and three confined artesian aquifers. The three confined aquifers are part of the principal aquifer for Utah Valley (USGS 2004). The topmost shallow unconfined aquifer can be found a few feet below ground in lower parts of the valley. The first major confined aquifer is the shallow artesian aquifer and is typically overlain by blue clay about 50 to 100 feet below ground. A second deep artesian aquifer is about 150 feet below ground, separated from the shallow aquifer by a fine grained sequence. A few wells penetrate to depths greater than 500 feet and are completed in underlying deposits (USGS 2002). Figure 3-20 depicts the groundwater system in northern Utah Valley.

Figure 3-20: Groundwater System in Northern Utah Valley





Sources: Utah AGRC & Utah County. Water use layer was clipped to study area boundary and new fields were added to the water use file and source protection zone file to help summarize the data.



Project Area Context

SR-92 Project
Freeway
Hwy. Entrance
US Route
State Road
Local Arterial
Residential St.
Railroads
Canal
Tunnel
Intermt. Stearm
Perenn. Stream
Aqueduct

Ground Water Study Area
DWSP Zone 1 (in 100 foot radius)
DWSP Zone 2
DWSP Zone 3
DWSP Zone 4

Water Uses
Domestic
Irrigation
Municipal
Other
Power
Stockwatering
Public Water Sources

0 0.5 1 Mile

Figure 3-21

Groundwater

SR-92: Lehi - Highland
Environmental Assessment

Groundwater Recharge Areas

The principal recharge area for the basin fill is in the eastern part of the valley, along the base of the Wasatch Range; see Figure 3-20 for more detail. The SR-92 corridor is within the primary and secondary recharge areas. Groundwater in Utah Valley generally moves from the base of the Wasatch Mountains toward Utah Lake. However, groundwater flow moves toward the Jordan River on the west end of the corridor (USGS 2004).

Drinking Water Sources

As shown on Figure 3-21, there are currently five public drinking water wells within one-half mile of the corridor.

Table 3-28: Public Drinking Water Wells Within One-Half Mile of Corridor

ID Number	System Owner	System Name	Type	Status
25014-02	Highland Water Company	Well 2	Community	Active
25014-04	Highland Water Company	Well 4	Community	Active
25014-05	Highland Water Company	Well 5	Community	Active
25139-01	IM Flash Technologies	Well 1	Non-Transient Non-Community*	Inactive
25093-01	Utah State Development Center	Well 1	Non-Transient Non-Community*	Inactive

** Non-transient, non-community water systems regularly serve at least 25 of the same nonresident persons per day for more than six months of the year.*

Source: DDW 2007

DWSP zones are shown in Figure 3-21. DWSP zones were not delineated for the IM Flash Technologies well or the Utah State Development Center (USDC) well because they are currently inactive. As seen in Figure 3-21, SR-92 intersects DWSP zones for the Highland Water Company wells listed in Table 3-28 as well as other wells that are farther than one-half mile from the corridor.

SR-92 lies within Zone 2 for Highland Well 2 and Well 5, meaning contaminants from the road could reach the well within 250 days. Both wells are over 600 feet deep. The wells draw on a water source that is over 300 feet deep. The drill logs suggest several confining layers of clay and other larger size sediments. However, it is unclear whether these wells have a grout seal to protect them. Therefore, the DWSP plans classify these aquifers as unprotected. The DWSPs plans identify SR-92 as a potential contamination source. The potential contaminants of concern include hazardous materials transported on SR-92 and salt and snow removal chemicals. Businesses use SR-92 to deliver necessary chemicals: the U.S. Forest Service (USFS) and other federal and state parks use SR-92 to transport raw sewage from privy vaults at campgrounds in American Fork Canyon. If a spill occurs, contaminants could find a direct route into the storm drain or sewer systems or into surface waters and could potentially contaminate the groundwater. The DWSP plans identify the following regulatory controls to protect the wells from potential contamination that could result from spills on SR-92:

- Spills will flow to the edge of the road where there are curb and gutter systems in place; these systems will convey the spill to a drain system.
- The asphalt will protect the soil from the contamination of spills by acting as an impermeable barrier.

The DWSP plans conclude that these controls are adequate for minimizing, to the greatest possible extent, the risk that SR-92 presents to Well 2 and Well 5. SR-92 lies also within Zone 3 for these same two wells and within Zone 4 for eight additional wells, which could be reached by contaminants within 15 years.

Groundwater Rights

In addition to public drinking water source wells, there are numerous private wells. Figure 3-21 shows all wells in the DWRi database within one-half mile of the corridor. These wells are classified according to use.

Table 3-29: Wells Within Groundwater Study Area

Use	Number of Wells
Domestic	126
Irrigation	102
Municipal	44
Stock Watering	1
Other	24
Domestic Use: Indicates the well supplies drinking water to private homes or businesses. *Municipal Use: Indicates the well is owned by a city or county for a variety of uses, including drinking water or agricultural.*	

Groundwater Quality

Groundwater in Utah is classified according to TDS concentration and contaminant concentration. Class IA groundwater is referred to as pristine groundwater and is characterized by a TDS concentration less than 500 mg/L. Class II groundwater is referred to as drinking-water quality groundwater and is characterized by a TDS concentration between 500 and 3000 mg/L. Neither Class IA nor Class II groundwater may have contaminant concentrations that exceed the groundwater quality standard. When sufficient information is available, entire aquifers or parts of aquifers may be classified by the Utah Water Quality Board. The groundwater quality for the principal aquifer in northern Utah County ranges from Class IA to Class II based on available USGS data (USGS 2004).

Impacts

The main pollutants of concern for surface waters are TDS, TP, and other sediments. TDS and TP already exceed water quality standards in Utah Lake. Although roadway runoff is not the main source of these pollutants in Utah Lake, these pollutants are present in roadway runoff. TDS may be present in roadway runoff from de-icing materials, vehicle deposits, and pavement wear. TP may be present in roadway runoff from sediments. Hazardous materials spills are also a concern for surface waters and groundwater as noted on the DWSP plans for wells along the corridor. For any construction project, sediments associated with temporary erosion are a concern for water quality.

No-Build Alternative

The No-Build Alternative would not result in any new direct impacts to water quality. There would be no increase in impervious area (e.g., pavement) and no corresponding increase in stormwater runoff volume. This alternative would not result in an increase in sediment loading due to construction. Therefore it is unlikely that the No-Build would result in an increase in TP. This alternative would also not result in an increase in the application of de-icing chemicals. However, there would be an increase in traffic, which could increase vehicle deposits and pavement wear. Therefore, it is likely that the No-Build Alternative could indirectly result in an increase in TDS.

Under this alternative, no new curb and gutter or roadside ditches would be constructed. Stormwater runoff would continue to sheet flow into the American Fork River, Dry Creek, and Provo Reservoir Canal and into various ditches, including Bull River, Pleasant Grove, American Fork, and Lehi ditches. When the Provo Reservoir Canal is enclosed in the future, existing stormwater discharges would no longer be allowed. An increase in traffic without improvements to the roadway could increase the potential for accidents and accidental spills. If an accidental spill were to occur in an area where there is no curb and gutter adjacent to surface waters, it would be more difficult to contain the spill than under the Preferred Alternative.

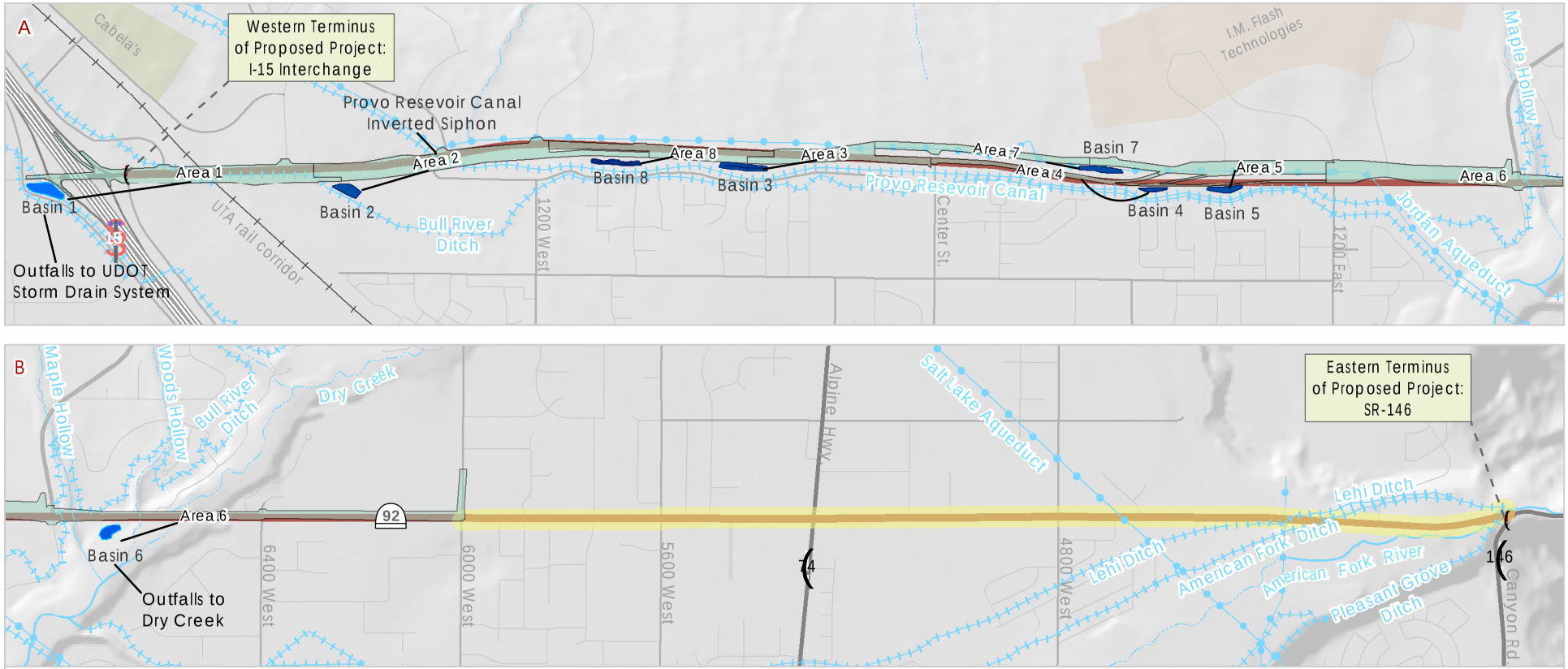
Preferred Alternative

Stormwater Runoff

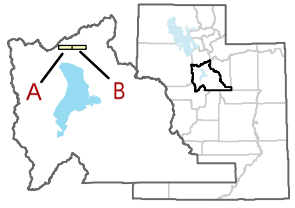
Under the Preferred Alternative, there would be an increase in impervious area and a corresponding increase in stormwater runoff peak flow. The SR-92 impervious area would increase by approximately 61.41 acres. This would result in a total increase of 6.47 cfs for the 24 hour 100-year storm event. An increase in impervious area would also result in an increase in the application of de-icing chemicals, vehicle deposits, and pavement wear, thereby increasing TDS. The Preferred Alternative could also result in a temporary increase in sediment loading during construction, thereby temporarily increasing TP.

Impacts to Surface Water

The Preferred Alternative would have a positive long-term impact to the water quality of all surface waters along the corridor. Runoff from impervious areas (e.g., pavement) currently sheet flows off SR-92 and may discharge to the American Fork River, Dry Creek, the Provo Reservoir Canal, and numerous ditches, such as Bull River, Pleasant Grove, American Fork, Mitchell, Wynn, and Lehi ditches. Under the Preferred Alternative, curb and gutter or roadside ditches would be constructed to collect runoff from paved areas. The runoff would then be discharged to locations where pollutants could be removed, such as vegetated swales, dry wells, and retention or detention basins. In some isolated areas, including bridges and retaining walls, it may not be feasible to collect all runoff for treatment. The conceptual drainage design is shown on Figure 3-22. The two planned detention basins would discharge to Dry Creek or to an existing UDOT storm drain facility near I-15. Dry Creek eventually flows to Utah Lake and the existing storm drain facility eventually flows to the Jordan River. Discharge to Utah Lake and the Jordan River would not be degraded due to treatment in the detention basins. Under the Preferred Alternative, runoff from pavement on SR-92 would be designed not to discharge to the Provo Reservoir Canal or to agricultural ditches for the 10-year storm event.



Sources: Utah AGRC, H.W. Lochner, Inc.



Project Area Context

Existing SR-92 | Hwy. Entrance | State Road | Residential St. | Canal | Intermt. Stream | Aqueduct
Freeway | US Route | Local Arterial | Railroads | Tunnel | Perenn. Stream

Storm Water conveyed to Dry Wells
Area Contributing to Basin
Proposed Detention Basin
Proposed Retention Basin

0 0.25 0.5 Mile

Figure 3-22
Conceptual Drainage Design

SR-92: Lehi - Highland
Environmental Assessment

Additionally, if there was a hazardous material spill, the collection system would provide a better opportunity to contain and treat the spill before it entered surface water.

Impacts to Groundwater

Under the Preferred Alternative, there would be an increase in impervious area and a corresponding increase in stormwater runoff and roadway-related pollutants infiltrating the shallow, unconfined aquifer. However, the potential for impacts to the principal aquifer are expected to be limited. The topmost of the three confined aquifers comprising the principal aquifer is typically overlain by clay about 50 to 100 feet below ground. Pollutants—including TDS—would be removed through infiltration and adsorption as groundwater flows through the soil.

It is the responsibility of Highland City to ensure that the DWSP plan for their public drinking water wells is enforced. Coordination with the Highland City engineer indicated that dry wells could be used in Highland and that the DWSP plans would not be violated as long as dry wells were not located in Zones 1 or 2 for Highland Wells 2 and 5 (Ship 2007). Therefore, the conceptual drainage plan does not include dry wells in these areas.

It is possible that up to ten private wells could be impacted under the Preferred Alternative. Wells within the proposed SR-92 right-of-way would be impacted because the owners would not be able to maintain ownership. If a well needs to be relocated, UDOT would either purchase the water right or negotiate an agreement with the owner to replace the well.

Temporary Construction Impacts

Construction activities—such as grading, heavy equipment traffic, stockpile, and material staging—disturb vegetation and cause erosion. Runoff from disturbed areas could increase suspended sediment loading into surface waters. Construction activities near Dry Creek, the American Fork River, the Provo Reservoir Canal, and the various agricultural ditches could result in temporary impacts to the quality of these surface waters. Construction equipment and materials could leak if not properly handled, which would potentially impact surface waters and groundwater.

Mitigation

Mitigation Measures for Impacts to Surface Water Quality

The conceptual drainage design is shown in Figure 3-22 and summarized in Table 3-30. Drainage for the Preferred Alternative will be designed for the ten-year storm event to ensure the following:

- Runoff from SR-92 pavement will be collected and treated in a vegetated swale, detention basin, retention basin, or dry well. Note that there may be small, isolated locations where collection and treatment is not practical—for example, bridge decks in sag locations.
- There will be no increase in peak flows from SR-92 pavement discharging to surface waters.
- No runoff from SR-92 pavement will enter the Provo Reservoir Canal prior to or after canal enclosure.
- Existing off-site drainage patterns will be maintained across SR-92. Existing culvert crossings carrying water from the north side of the road to the south will be accommodated.

Figure 3-23: Dry Well

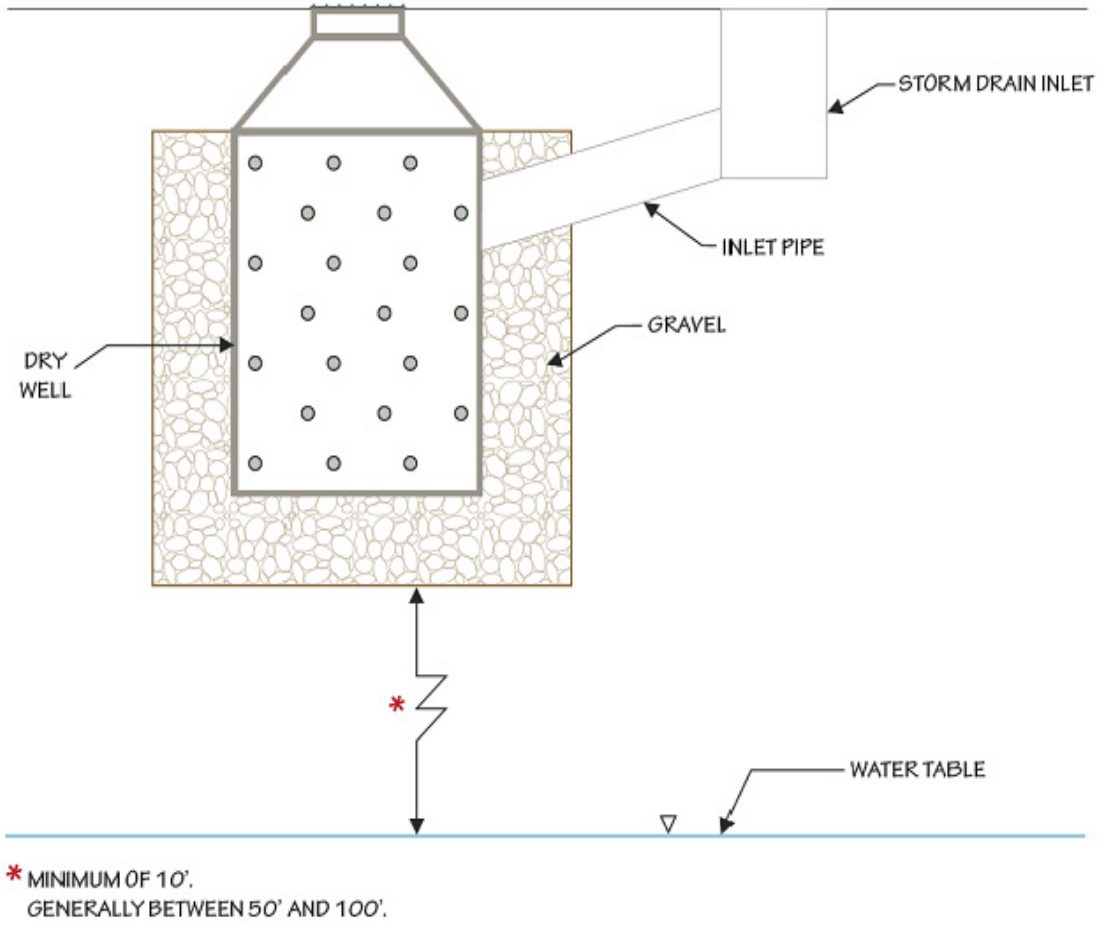


Table 3-30: Conceptual Drainage Design

Area	Location	Total Flow Increase (cfs)	Increase in Impervious Area	Receiving Facility	Receiving Facility Size Volume (ac-ft)	Outfall Location
1	Between the I-15 southbound on-ramp and the frontage road south of SR-92	0.77	7.27	Detention	3.00	Release at existing rate into UDOT system on frontage road
2	562 feet east of Triumph Boulevard south of SR-92	1.02	9.68	Retention	3.19	N/A
3	2173 feet west of Center Street of SR-92	0.48	4.53	Retention	1.44	N/A
4	2081 feet west of 1200 East south of SR-92	0.04	0.36	Retention	0.84	N/A

Area	Location	Total Flow Increase (cfs)	Increase in Impervious Area	Receiving Facility	Receiving Facility Size Volume (ac-ft)	Outfall Location
5	1087 feet west of 1200 East south of SR-92	0.80	7.62	Retention	2.34	N/A
6	681 feet west of Highland Boulevard south of SR-92	1.40	13.25	Detention	3.01	Release at existing rate into Dry Creek
7	1810 feet east of 500 West north of SR-92	0.63	5.96	Retention	1.25	N/A
8	718 feet east of 1200 East south of SR-92	0.50	4.72	Retention	1.69	N/A
	Highland	0.84	8.02	Dry Wells	4.08	Ground-water recharge area

Additionally, best management practices (BMPs) will be implemented as part of the Preferred Alternative to mitigate impacts to surface waters:

- Plan elements for permanent storm water runoff control and treatment will be submitted to DWQ.
- Contractor will not use any fill material that may leach organic chemicals (e.g., discarded asphalt) or nutrients (e.g., phosphate rock) into the receiving water.

Mitigation Measures for Impacts to Groundwater Quality

BMPs will also be implemented as part of the Preferred Alternative to mitigate impacts to groundwater:

- No dry wells will be constructed in DWSP Zones 1 or 2, as shown on Figure 3-21.
- UIC inventory forms for stormwater dry wells will be filed with the UIC coordinator at DWQ prior to construction.
- If a well is impacted, UDOT will purchase the water right or the lands associated with the water right or will replace the well. If a well needs to be abandoned, it will be abandoned by a licensed individual in accordance with UAC 655-4-12.

Mitigation Measures for Temporary Construction Impacts to Water Quality

Mitigation for temporary construction impacts will be addressed through UPDES permit requirements and through the use of BMPs:

- Contractor will obtain coverage under the UPDES Storm Water General Permit for Construction Activities.
- An erosion control plan and SWPPP will be developed and incorporated into construction documents. Plans will specifically address protection of surface waters including Dry Creek, the American Fork River, the Provo Reservoir Canal, and various agricultural ditches, such as Bull River, Lehi, American Fork, Pleasant Grove, and Wynn Ditches.

- If necessary, contractor will obtain coverage under the UPDES General Permit for Construction Dewatering.
- Existing vegetation will be protected by preventing disturbance beyond specified construction limits.
- BMPs for erosion control will be used where appropriate to keep sediment laden runoff from leaving the construction site.
- Disturbed areas will be stabilized and revegetated in accordance with UDOT Standard Specifications 02912 Topsoil and 02922 Seed, Turf Seed, and Turf Sod or other landscaping requirements specified by UDOT during the design phase.
- Runoff will be diverted away from exposed soil.
- Where possible, materials and equipment will be staged away from stream banks and located in areas that minimize impacts to existing vegetation.
- The contractor will submit a spill prevention, containment, and counter measure plan (SPCCP), which will include an inspection program for equipment operating near surface water, for refueling and maintenance procedures, for parking locations for equipment, and for preparations for a quick response to accidental spills of petroleum or hazardous substances.
- The contractor will notify the DWQ whenever the water turbidity in adjacent surface water is visibly increased.
- The SWPPP and SPCCP will meet UDOT requirements. These documents are available to the public. Reclamation or their designee will be provided a copy of the SWPPP and SPCCP upon request.

The table below describes the likely water quality permits and approvals necessary for implementation of the Preferred Alternative:

Table 3-31: Table of Permits and Approvals

Agency	Permit/Approval Required	Description
DWQ	Section 402 UPDES Storm Water General Permit	Development of a SWPPP and temporary erosion control plan required during design phase. Filing of notice of intent (NOI) required prior to construction.
DWQ	Section 402 UPDES General Permit for Construction Dewatering	May be required if there are any dewatering activities during construction.
DWQ	Underground Injection Control Inventory	UIC inventory forms for stormwater dry wells, which can be found at http://www.waterquality.utah.gov/UIC/UICInvInf/UtahUICInvInfFrms.htm, must be filed with UIC coordinator prior to use.

3.13 WILDLIFE

Regulatory Setting

Migratory Birds

The Migratory Bird Treaty Act (MBTA)—16 USC 703 to 711, as amended—authorizes the U.S. Fish and Wildlife Service (USFWS) to regulate the taking, either intentionally or unintentionally, of migratory birds. A complete list of protected species is identified in 50 CFR 10.13. *Take* means "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities" (50 CFR 10.12). A take does not include habitat destruction or alteration as long as there is no direct taking of birds, nests, eggs, or parts thereof. The responsibility of federal agencies for compliance with the MBTA is clarified in EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds.

Federally Listed Threatened and Endangered Species

The USFWS is responsible for maintaining a list of threatened and endangered species that are protected under the Federal Endangered Species Act (ESA)—Public Law 93-205, as amended. The ESA requires federal agencies to consult with the USFWS and review proposed actions that may impact any listed species or their critical habitat.

Utah Sensitive Species

DWR maintains a list of sensitive wildlife species pursuant to DWR Administrative Rule R657-48. By state rule, threatened and endangered wildlife species, candidate species, or species for which a conservation agreement is in place automatically qualify for the Utah Sensitive Species List. Conservation agreement species are those species that are currently receiving sufficient special management under a conservation agreement developed and/or implemented by the state to preclude federal ESA listing. The Utah Sensitive Species List also includes wildlife species of concern (WSC), which are designated by DWR. These are species with a credible threat to continued population viability in the State of Utah. WSC are not protected by either state or federal law. Their listing is intended to promote timely and appropriate conservation actions that will preclude the need to list these species under the provisions of the federal ESA (DWR 2007a).

Affected Environment

The wildlife study area was a 353-acre corridor that generally followed the centerline of the existing SR-92 road alignment between the I-15 interchange and the mouth of American Fork Canyon. The 353-acre corridor contains all land and water bodies that could be directly impacted by the construction of the Preferred Alternative. This acreage is made up of approximately 349 acres of land and about four acres of waterbodies, canals, and ditchlines.

Because the SR-92 study area is situated within a rapidly developing urbanized landscape, DWR recommended that the terrestrial wildlife analysis focus on migratory birds, big game, and urban wildlife (Green 2007a).

The listing for threatened, endangered and candidate species in Utah County was obtained from the USFWS website http://www.fws.gov/mountain-prairie/endspp/name_county_search.htm. The information from this website is provided in Table 3-32.

Table 3-32: Federally Listed Threatened and Endangered Species for Utah County, Utah

Species	Type	Federal Status
Ute Ladies'-Tresses *(Spiranthes Diluvialis)*	Plant	Threatened
Deseret Milkvetch *(Astragalus Desereticus)*	Plant	Threatened
Clay Phacelia *(Phacelia Argillacea)*	Plant	Endangered
Western Yellow-Billed Cuckoo *(Coccyzus Americanus)*	Bird	Candidate
Canada Lynx *(Lynx Canadensis)*	Mammal	Threatened
June Sucker *(Chasmistes Liorus)*	Fish	Endangered
Utah Valvata Snail *(Valvata Utahensis)*	Mollusk	Endangered

The Utah Sensitive Species List for Utah County was obtained from the DWR website http://dwrcdc.nr.utah.gov/ucdc/ViewReports/sscounty.htm. The information from this website is provided in Table 3-33.

Table 3-33: Utah Sensitive Species Listed for Utah County, Utah

Species	Type	Status
American White Pelican *(Pelecanus Erythrorhynchos)*	Bird	SPC
Bald Eagle *(Haliaeetus Leucocephalus)*	Bird	S-ESA
Black Swift *(Cypseloides Niger)*	Bird	SPC
Bobolink *(Dolichonyx Oryzivorus)*	Bird	SPC
Burrowing Owl *(Athene Cuniculari)*	Bird	SPC
Ferruginous Hawk *(Buteo Regalis)*	Bird	SPC
Greater Sagegrouse *(Centrocercus Urophasianus)*	Bird	SPC
Lewis's Woodpecker *(Melanerpes Lewisi)*	Bird	SPC
Long-Billed Curlew *(Numenius Americanus)*	Bird	SPC
Northern Goshawk *(Accipitor Gentilis)*	Bird	CS
Short-Eared Owl *(Asio Flammeus)*	Bird	SPC
Three-Toed Woodpecker *(Picoides Tridactylus)*	Bird	SPC
Western Yellow-Billed Cuckoo *(Coccyzus Americanus)*	Bird	S-ESA
Brown (Grizzly) Bear *(Ursus Arctos)*	Mammal	S-ESA
Fringed Myotis *(Myotis Thysanodes)*	Mammal	SPC
Kit Fox *(Vulpes Microtus)*	Mammal	SPC

Species	Type	Status
Spotted Bat *(Euderma Maculatum)*	Mammal	SPC
Townsend's Big-Eared Bat *(Corynorhinus Townsendii)*	Mammal	SPC
Western Red Bat *(Lasiurus Blossevillii)*	Mammal	SPC
White-Tailed Prairie Dog *(Cynomys Leucurus)*	Mammal	SPC
Bluehead Sucker *(Catostomus Discobolus)*	Fish	CS
Bonneville Cutthroat Trout *(Oncoryhnchus Clarkii Utah)*	Fish	CS
Colorado River Cutthroat Trout *(Oncorhynchus Clarkii Pleuriticus)*	Fish	CS
June Sucker *(Chasmistes Liorus)*	Fish	S-ESA
Least Chub *(Lotichthys Phlegethontis)*	Fish	CS
Leatherside Chub *(Gila Copei)*	Fish	SPC
Roundtail Chub *(Gila Robusta)*	Fish	CS
Columbia Spotted Frog *(Rana Luteiventris)*	Amphibian	CS
Western Toad *(Bufo Boreas)*	Amphibian	SPC
Smooth Green Snake *(Opheodrys Vernalis)*	Reptile	SPC
California Floater *(Anodonta Californiensis)*	Mollusk	SPC
Desert Valvata *(Valvata Utahensis)*	Mollusk	S-ESA
Eureka Mountain Snail *(Oreohelix Eureknesis)*	Mollusk	SPC
Southern Bonneville Springsnail *(Pyrgulopsis Transversa)*	Mollusk	SPC
Utah Physa *(Physella Utahensis)*	Mollusk	SPC

SPC: Utah wildlife species of concern
CS: Species managed under conservation agreements to preclude the need for federal listing
S-ESA: Federally listed or candidate species under the federal ESA

Source: DWR 2008b

Table 3-34: Habitat Categories and Acreage Within SR-92 Study Area

Habitat	Approximate Acres
Existing Commercial/Residential Development	22
Existing Road Surface	101
Flood Control/Debris Basins and Other Undevelopable Land	29
Irrigated Farmland and Pasture	5.2
Undeveloped Grassland Zoned for Commercial/Residential Development	188
Riparian and Hillslope Habitats Associated with Stream Corridors	1.5
Stream Channels	1.2
Man-Made Canals and Irrigation Ditches	2.8
Existing Stormwater Detention Basin	2.4
Total	**353.1**

Source: Frontier Corporation 2008

Within the 353-acre study area, the existing areas with the best potential for wildlife habitat were identified:

- The 188 acres of undeveloped grassland that is zoned for future commercial or residential development.
- The 1.5 acres of riparian and hillslope habitat associated with the Dry Creek and American Fork River stream corridors.
- The 1.2 acres of in-stream habitat associated with the Dry Creek and American Fork stream channels.
- The 5.2 acres of irrigated farmland and pastures that are located within the city limits of Highland.
- The 2.8 acres of man-made canals and irrigation ditches.

The undeveloped grasslands are located mainly between the I-15 interchange and the Dry Creek stream corridor. Vegetation is mostly upland grasses, forbs, and common weeds interspersed with small patches of rabbitbrush and sagebrush. The majority of the grassland habitat is situated within IM Flash Technologies and Traverse Mountain properties, both of which are located on the north side of the SR-92 study area. Because these properties contain commercial and residential developments, the undeveloped grassland is mowed and tilled to manage weeds and reduce the risk of range fire. Also included in this habitat category are the grasslands situated along the Provo Reservoir Canal and SR-92 right-of-way.

Remaining farmland and pasture areas are situated within the city limits of Highland. They are primarily irrigated alfalfa fields and livestock pasture comprised of a variety of upland grasses and common weed species.

Aquatic habitats are associated with the Dry Creek and American Fork stream channels. The riparian habitats adjacent to the stream channels are wooded and chiefly comprised of box elder, cottonwood, Douglas hawthorn, sandbar willow, red osier dogwood, woods rose, and wild currant. The steep hillslopes adjacent to the riparian areas are also wooded and chiefly comprised of gambel oak and rocky mountain maple. Narrow bands of riparian habitat are also present along certain canal and ditch segments.

Terrestrial Wildlife

Within the study area, habitat for hawks, owls, eagles, common songbirds, doves, pigeons, crows, woodpeckers, and other migratory birds is mostly associated with the undeveloped riparian and hillslope areas along the Dry Creek and the American Fork River stream corridors. The habitat is also associated with the narrow bands of riparian trees and shrubs associated with certain canal and ditch sections. A colony of cliff swallow has been observed nesting in the cement culvert where SR-92 crosses Dry Creek. Mallard duck, killdeer, and other waterfowl and shorebirds may use stream corridors, canals, and ditches when sufficient water is present.

The grasslands and farmland pastures likely provide some forage opportunities for hawks, owls, eagles, crows, meadowlark, and other songbirds. Additionally, migratory songbirds such as sparrows and robins may use landscaped areas within the residential and commercial developments.